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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
DI GRAZIO, JEANNE A	
ART UNIT	PAPER NUMBER
2871	

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

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Office Action Summary	Application No.	Applicant(s)
	09/819,800	UMEDA ET AL.
	Examiner	**Art Unit**
	Jeanne A. Di Grazio	2871

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 March 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Priority

Priority to Japanese Patent Applications: 100677-2000 (April 3, 2000) and 345352-2000 (Nov. 13, 2000) is claimed.

This Office Action replaces the First Official Action mailed Nov. 6, 2002.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-6, 8, 19, and 21 rejected under 35 U.S.C. 103(a) as being unpatentable over Mori et al. (US 5,805,253).

Per claims 1-6, 8, 19, and 21: An optical compensation sheet with at least two optically anisotropic layers (**Figure 9, OC1 and OC2**) each formed by orienting an optically anisotropic compound (**Figure 2, liquid crystal layers 22a and 22b**)(it may be implied that the liquid crystal of Mori, is positive or negative uniaxial, biaxial, or a combination of these), the orientation direction in the optically anisotropic layer plane of the optically anisotropic compound in the two optically anisotropic layers intersecting each other at an angle of from 80 to 100 degrees (**transmission axes, PA and PB oriented at 90 degrees, Col. 20, Lines 48-52**), wherein, viewing the two optically anisotropic layers from one side of the optical compensation sheet, one of the two optically anisotropic layers, when the optically anisotropic compound is uniaxial (**Col. 22, Line 22**), is oriented so that a first angle of the optic axis of the uniaxial

optically anisotropic compound to the optical compensation sheet plane increases continuously or stepwise in the thickness direction of the optical compensation sheet, or when the optically anisotropic compound is biaxial, is oriented so that a second angle of a direction giving maximum refractive index of the biaxial optically anistropic compound to the optical compensation sheet plane increases continuously or stepwise in the thickness direction of the optical compensation sheet, and the other optically anisotropic layer, when the optically anisotropic compound is uniaxial, is oriented so that the first angle decreases continuously or stepwise in the thickness direction of the optical compensation sheet, or when the optically anisotropic compound is biaxial, is oriented so that the second angle decreases continuously or stepwise in the thickness direction of the optical compensation sheet. **See discussion in per claims 1-6, 8, 19, and 21.**

Applicant also recites in claim 19, first and second polarizing plates where an optical compensation sheet is either between the first polarizing plate and the liquid crystal cell or between the second polarizing plate and the liquid crystal cell.

Applicant furthermore recites in claim 21, a polarizing plate for elliptically polarized light comprising the optical compensation sheet of claim 1.

Per claims 1-6, 19, and 21: The Examiner interprets these claims to mean in relevant part, according to Applicant's Amendment of March 5, 2003, that "the manner of orientation of the optically anisotropic compound is such that the first or second angle in one of the two optically anisotropic layers increases in the thickness direction, and the corresponding angle in the other optically anisotropic layer decreases in the thickness direction." (Amendment, Page 6).

In other words, the Examiner interprets the claims to mean with respect to layer 1, whether the anisotropic compound is uniaxial or biaxial, the first angle increases continuously or stepwise in the thickness direction of the optical compensation sheet and likewise with respect to the second layer, whether the anisotropic compound is uniaxial or biaxial, the second angle decreases continuously or stepwise in the thickness direction of the optical compensation sheet.

Claims 1-6, 8, 19, and 21 are obvious in view of Mori et al. for the reasons that follow.

Mori has a liquid crystal display with compensators as best illustrated in Figures 9 and 10. Mori also discloses the use of polarizing plates (Figure 9, plates A and B) with the compensation sheets in between. The polarizing plates incorporate the optical compensation sheets. Mori also has a support (Figure 8, support 86).

Specifically, the liquid crystalline anisotropic structure in Mori, exhibits hybrid alignment and angle increases and decreases in the thickness direction of the compensation films.

Referring to Column 17, Lines 49-63: Mori discloses that an angle increases or decreases continuously or intermittently according to the thickness.

Mori may not appear to spell out the invention as claimed in claim 1; however, because Mori teaches the use of two such optically anisotropic layers, then in each of the layers, the inclined angle increases or decreases continuously or intermittently in the thickness direction with respect to the other layer. It would thus have been obvious to one of ordinary skill in the art at the time the invention was made to arrange any such combination of angle increases / decreases with respect to thickness and the respective layers at issue in light of the teachings in Mori. Specifically, the Examiner directs Applicant's attention to the line "variation containing

increase or decrease" suggesting that the various layers of the Mori invention can be constructed to suit desired compensation effect(s).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to derive various combinations of inclined angles with respect to adjacent layers for the purpose of a hybrid alignment LCD wherein viewing angle is enlarged and almost free of black and white image gradation (Col. 3, Lines 15-35).

Claim 7 rejected under 35 U.S.C. 103(a) as being unpatentable over Mori et al. (US 5,805,253) in view of Arakawa et al. (US 6,400,433 B1).

Per claim 7: The optical compensation sheet providing a wavelength dispersion property satisfying the following formulae (2) and (3): formula (1) Re = (nx1-ny1) x d, formula (2) Re (589.3) – Re (480) $\leq$ 45 nm, formula (3) 0.7 $\leq$ Re (480)/Re (589.3) $\leq$ 1.4 wherein, regarding the direction giving maximum refractive index in the plane of the optical compensation sheet as the X axis, the direction in the optical compensation sheet plane normal to the X axis as the Y axis, and the direction perpendicular to the optical compensation sheet plane as the Z axis, viewing the point (referred to also as the origin), at which the X, Y, and Z axes intersect, from any point on the YZ plane perpendicular to the optical compensation sheet plane, and obtaining angle (theta) giving minimum of a retardation in the plane (Re) at wavelength 590 nm represented by formula (1) above in the plane perpendicular to the viewing direction, retardation Re (589.3) in the plane perpendicular to the viewing direction at the wavelength 589.3 nm and retardation Re (480) in the plane perpendicular to the viewing direction at the wavelength 480 nm each are measured at angle (theta), and wherein nx1 represents maximum refractive index at wavelength 590 nm in the plane perpendicular to the viewing direction, ny1 represents minimum refractive index at

wavelength 590 nm in the plane perpendicular to the viewing direction, and d represents a thickness of the sheet.

Mori does not appear to have the recitation of claim 7; however, Arakawa et al. has wavelength and retardation values within Applicant's claimed ranges for a polarizing plate that can function within a broad range of wavelength ranges. See Columns 3 and 4. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Mori in view of Arakawa for a polarizing plate of a wide range of wavelengths and retardation values so that the wave plate would act essentially as a quarter wave plate and that could be easily manufactured (Col. 2, Lines 6-8, 10-12, and 18-25).

Claims 9-14 and 16 rejected under 35 U.S.C. 103(a) as being unpatentable over Mori et al. (US 5,805,253) in view of Negoro et al. (US 2002/0063828).

Per claims 9-12: Mori does not appear to specify that one layer of the two optically anisotropic layers is provided on one side of the support and the other layer of the two optically anisotropic layers is provided on the other side of the support, and the two optically anisotropic layers are provided on one side of the support, and the two optically anisotropic layers are provided between the two supports; however, Negoro has the arrangements of the supports as shown in Figures 1 and 2 for a basic structure of transmissive and reflective LCD displays [0029] and [0039]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Mori in view of Negoro for the basic, conventional structure of reflective and transmissive LCD devices.

Per claims 13 and 16: Mori does not appear to specify that the support is transparent and has a negative uniaxial optical property with the optic axis in the direction perpendicular to the

optical compensation sheet plane and that the support is composed mainly of cellulose esters; however, Negoro teaches that the support is determined according to whether it is optically isotropic or anisotropic and the support is of a cellulose ester [0055] for the purpose of a high retardation film [Id.]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Mori in view of Negoro for a high retardation transparent film that can be conveniently and easily manufactured.

Per claim 14: The optical compensation sheet wherein the support satisfies the following formulae (4) and (4'): formula (4) $nx2 \geq ny2 \geq nz2$, formula (4') $(nx2-ny2)/nx2 \leq 0.01$ wherein nx2 represents maximum refractive index in the plane of the support, ny2 represents refractive index in the plane of the support in the direction perpendicular to the direction giving nx2, and nz2 represents refractive index in the support thickness direction.

Mori et al. discloses a polycarbonate film having a relationship akin to that of Applicant's (Col. 24, Lines 15-21) for the purpose of enlarged viewing angle and free from reversion of black and white image or gradation. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the recitations of claim 14 for an enlarged viewing angle almost free from reversion of black and white image or gradation (Mori et al., Col. 3, Lines 26-28).

Claims 15 and 17 rejected under 35 U.S.C. 103(a) as being unpatentable over Mori et al. (US 5,805,253) in view of Negoro et al. (US 2002/0063828 A1) in further view of Aminaka (US 6,064,457).

Per claim 15: The support has a retardation (Rt) in the thickness direction of 5 to 250 nm.

Mori does not appear to have the elements of claim 15; however, Aminaka does have a transparent support with retardation values of 5 to 100 nm and 100 to 1,000 nm (Col. 11, Lines 47-49 as an example) in part for improved viewing angle characteristics. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Mori in view of Aminaka for the transparent support retardation values of Aminaka for improved viewing angle characteristics (Col. 2, Line 31).

Per claim 17: The optical compensation sheet wherein at least one of the two optically anisotropic layers has a retardation (R_o) in the plane of 50 to 200 nm, R_o being represented by the formula (a): R_o = (nx-ny) x d wherein nx represents maximum refractive index in the plane of the optically anisotropic layer, ny represents refractive index in the plane of the optically anisotropic layer in the direction perpendicular to the direction giving nx, and d represents a thickness of the optically anisotropic layer.

Mori doers not appear to have the elements of claim 17; however, Aminaka discloses retardation values of an optically anisotropic layer in the ranges of 10 to 100 nm and 40 to 200 nm (Col. 11, Lines 32-38) in part to prevent color contamination. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Mori in view of Aminaka to prevent color contamination (Aminaka at Col. 3, Lines 38-39).

Claims 18 and 20 rejected under 35 U.S.C. 103(a) as being unpatentable over Mori et al. (US 5,805,253) in view of Jones et al. (US 5,990,997).

Per claim 18: At least one of the two optically anisotropic layers satisfies the following: when the direction normal to the optically anisotropic layer is regarded as 90 degrees, the direction parallel to the optically anisotropic layer and giving maximum refractive index in the

plane of the optically anisotropic layer is regarded as zero degrees, and retardation is measured at an incident angle from 0 to 90 degrees to the optically anisotropic layer, angle theta a (^{0}), giving maximum retardation (Re) in the plane at 590 nm represented by the following formula (1) in the plane perpendicular to the incident direction, is in the range of more than zero degrees to less than 90 degrees, and the maximum value of retardation is in the range of from 65 to 250 nm, formula (1) Re = (nx1-ny1) x d wherein nx1 represents maximum refractive index at 590 nm in the plane perpendicular to the incident direction, ny1 represents minimum refractive index at 590 nm in the plane perpendicular to the incident direction, and d represents a thickness of the optical compensation sheet.

Mori does not appear to have ranges of retardation values and orientations similar to those of Applicant's; however, Jones has these ranges for improved contrast. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Mori et al. in view of Jones et al. to include a broad range of retardation values and orientation directions for improved contrast (See Jones et al. ABS.).

Per claim 20: The orientation direction of one of the two optically anisotropic layers is substantially perpendicular to the transmission axis of the first polarizing plate and is substantially parallel to the transmission axis of the second polarizing plate, or the orientation direction of one of the two optically anisotropic layers is substantially perpendicular to the transmission axis of the second polarizing plate and is substantially parallel to the transmission axis of the first polarizing plate.

Mori does not appear to have the elements of claim 20; however, Jones et al. discloses orientation directions of retarders as that of substantially perpendicular to and or parallel with

respect to transmission axes of given polarizers (Col. 8, Lines 46-67) for better contrast and less inversion. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Mori in view of Jones et al. to improve viewing characteristics such as better contrast and less inversion (Jones et al., Col. 8, Lines 46-48).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeanne A. Di Grazio whose telephone number is (703)305-7009. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim, can be reached on (703) 305-3492. The fax phone numbers for the organization where this application or proceeding is assigned are (703)746-8741 for regular communications and (703)746-8741 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

Jeanne Andrea Di Grazio

JDG
August 10, 2003

Robert Kim, SPE

JAMES DUDEK
PRIMARY EXAMINER